

Welcome!

We will get started soon.

You have arrived at:

Get the Lead Out: Updates of EPA Assessment in Residential Soil



EPA MID-ATLANTIC REGION
2024 VIRTUAL SUMMIT

Empowering Communities for Environmental Equity

Friendly Reminders Before We Get Started

Please **mute yourself** and **turn off your webcam** during presentations.

If you encounter technical difficulties during the meeting, you can:

- ✓ Send a chat message directly to Host or IT Support
- ✓ Email epamidatlsummit@michaeldbaker.com with the subject line “Zoom Support” and make sure you let us know what session you are in.

This session is being recorded and will be made available after the summit.

Protecting Families & Children from Lead in Soil

- **This updated guidance lowers lead screening levels and strengthens EPA guidance for investigating and cleaning up lead contaminated soil in residential areas at Superfund and RCRA Corrective Action sites.**
 - Will ensure EPA uses the latest and best available science to protect children living and playing near sites contaminated by lead in soil.
 - Reflects Administration's commitment to protect communities from lead, especially those disadvantaged and overburdened facing multiple sources of lead.
 - Supports EPA's priority of recognizing the potential cumulative impacts from multiple sources of lead in a community.

EPA's Updated Screening Levels

- **Screening Level for Early Stages of Investigation at a Site:** EPA now recommends a screening level of *200ppm* when investigating residential areas with lead in soil.
- **Screening Level for Residential Areas with Multiple Exposures to Lead:** Generally, EPA recommends screening at *100 ppm* if there are other sources of lead exposure (e.g., lead paint, lead in water and/or air).
- **Previous Screening Level:** EPA previously recommended a screening level of 400 ppm for all sites.

How EPA Uses Screening Levels

- **Screening levels are not cleanup levels.** Screening levels are used when initially investigating a release to determine if the level of contamination warrants further investigation.
 - As a result of the lowered screening levels, EPA expects to investigate more residential properties for lead contamination and potential cleanup.
- **The guidance does not dictate a specific response action by EPA or other entities, including any specific cleanup level.**
 - EPA makes cleanup decisions and selects cleanup levels on a site-by-site basis using site-specific factors such as exposure and risk, community input, and background lead levels.

Superfund Residential Lead Sites Handbook

- Resource guide for RPMs, OSCs, and risk assessors evaluating residential lead sites
- Identifies tools and summarizes best practices to promote consistency and provide flexibility
- Captures advances in those tools and best practices which have evolved since EPA first issued the Handbook in 2003.
- Moving forward, each chapter of the Handbook will be a module that can be updated or modified as new information and experience are gathered.

Handbook Contents & Updates

- These chapters have expanded: Community Involvement (Ch 4), Health Education (Ch 5), and Site Characterization (Ch 6).
- These chapters have been updated and reorganized: Institutional Controls (Ch10), Five-Year Reviews for Superfund Sites (Ch 11), and Access and Enforcement (Ch 14).
- *Superfund Site Team and Collaboration (Ch 3)* has been added to recommend the members of a site team and their roles and responsibilities as well as introduce the most recent work on collaboration.

Handbook Contents & Updates

- *Residential Lead Risk Assessment (Ch 8)* has been added to provide the most recent science and tools (e.g., bioavailability) for assessing human health risk at lead-contaminated residential sites.
- *Implementation of Cleanup Levels Selection (Ch 9)* has been updated and expanded to provide a guide on prioritizing actions within a residential superfund site and the most recent tools and best practices when applying a cleanup level, including alternative cleanup methods other than excavation.
- *Source Attribution for Lead Contamination at Superfund Sites (Ch 7)* has been added to provide information for assessment at lead sites where source attribution techniques may be utilized to better inform site management decisions.



EPA's IEUBK Model for Lead in Children

(Integrated Exposure Uptake Biokinetic)

Next Steps

- **While the guidance is effective immediately, it will take time before any new remedial cleanup actions get underway. EPA Regions will:**
 - **Prioritize:** EPA will prioritize which sites and areas to assess first. EPA generally prioritizes areas based on risks to people and the environment.
 - **Evaluate and Act:** EPA will evaluate how the updated guidance impacts residential lead sites on a site-by-site basis. EPA will decide on next steps by following our established decision-making process, including robust community engagement and public input.
 - **Work with Partners and Communities:** EPA will also continue to work with our partners, including State and Tribal governments, and communities throughout the process. This includes government-to-government consultation where site-specific decisions may affect tribal interests.
- EPA opened a public docket to accept feedback from the public that may be considered in any future updates to the national guidance (input accepted until 5/16/2024).

What is the IEUBK Model

- The IEUBK is a software package that estimates blood lead levels in children (under 7 years old) who are exposed to lead contaminated media
- This model is used to assess risk and support environmental cleanup decisions at residential sites
- The model does not predict a blood lead for a specific child, but allows for estimates for a hypothetical child or population of similarly exposed children

Overview of the IEUBK Model

- Exposure Component

- Soil
- Dust
- Air
- Drinking water
- Diet

- Uptake Component

- Only a fraction of the Pb entering the body through the respiratory or gastrointestinal (GI) tracts is absorbed into the systemic circulation
- different bioavailabilities of Pb from different environmental media

Overview of the IEUBK Model

- Biokinetic Component

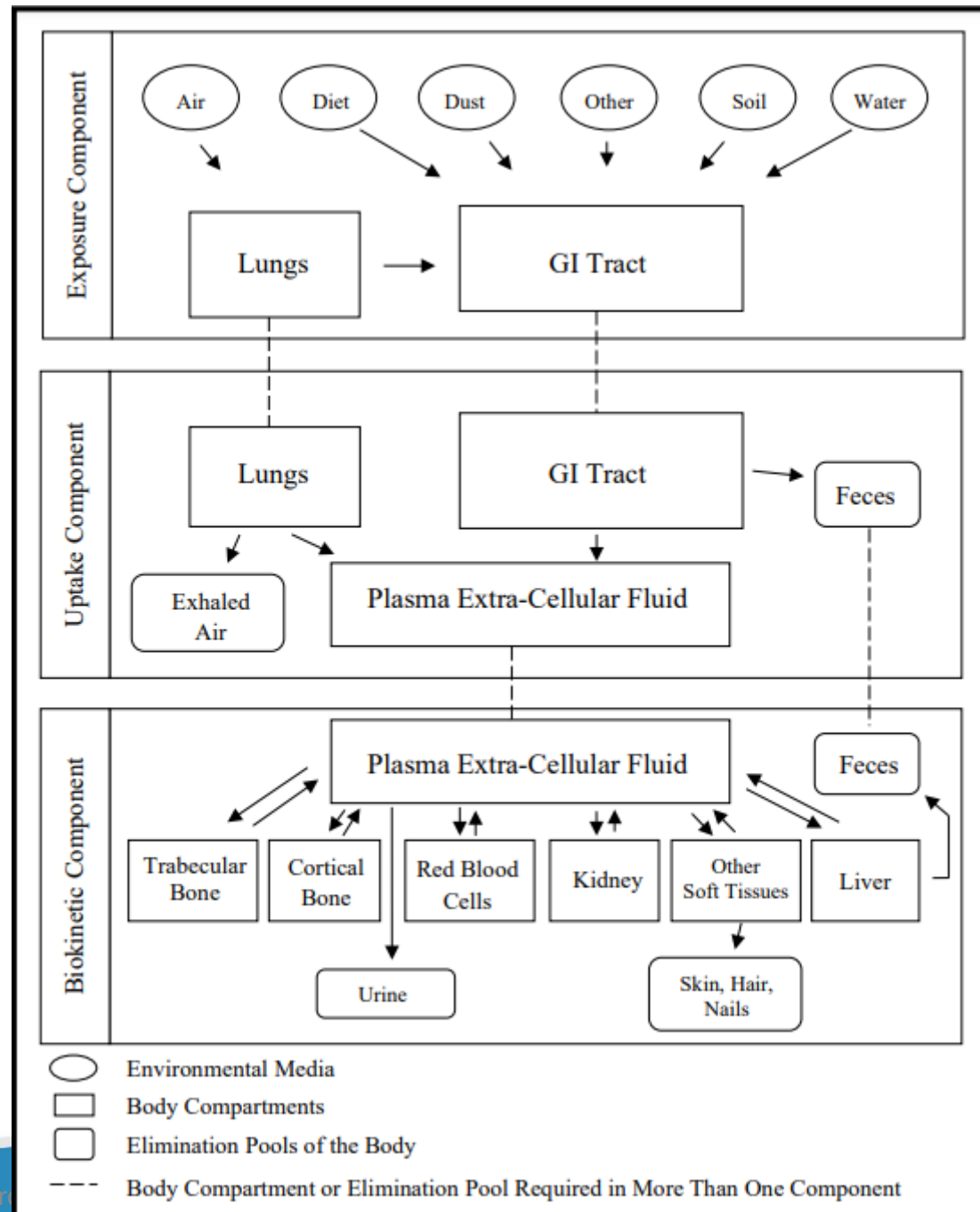
- transfer of absorbed Pb between blood and other body tissues
- elimination of Pb from the body
- storage and/or disposition of Pb

- Variability

- address variability in blood lead concentrations among exposed children

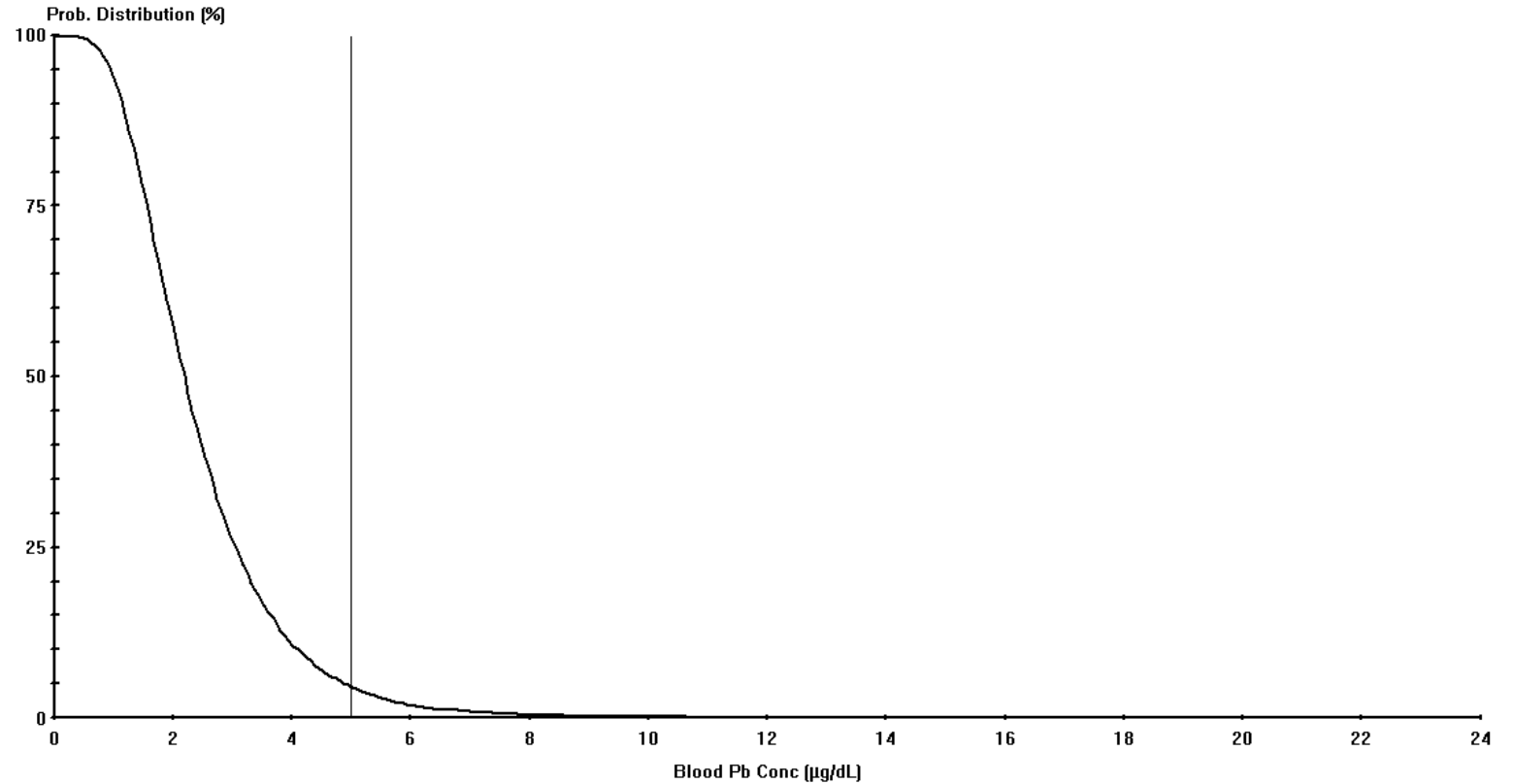
Biological Structure

- uses data from a variety of scientific studies of Pb biokinetics, contact rates of children with contaminated media, and data on the presence and behavior of environmental Pb



Model Output

- Calculate risk



Cutoff = 5.000 µg/dl
Geo Mean = 2.306
GSD = 1.600
% Above = 4.979

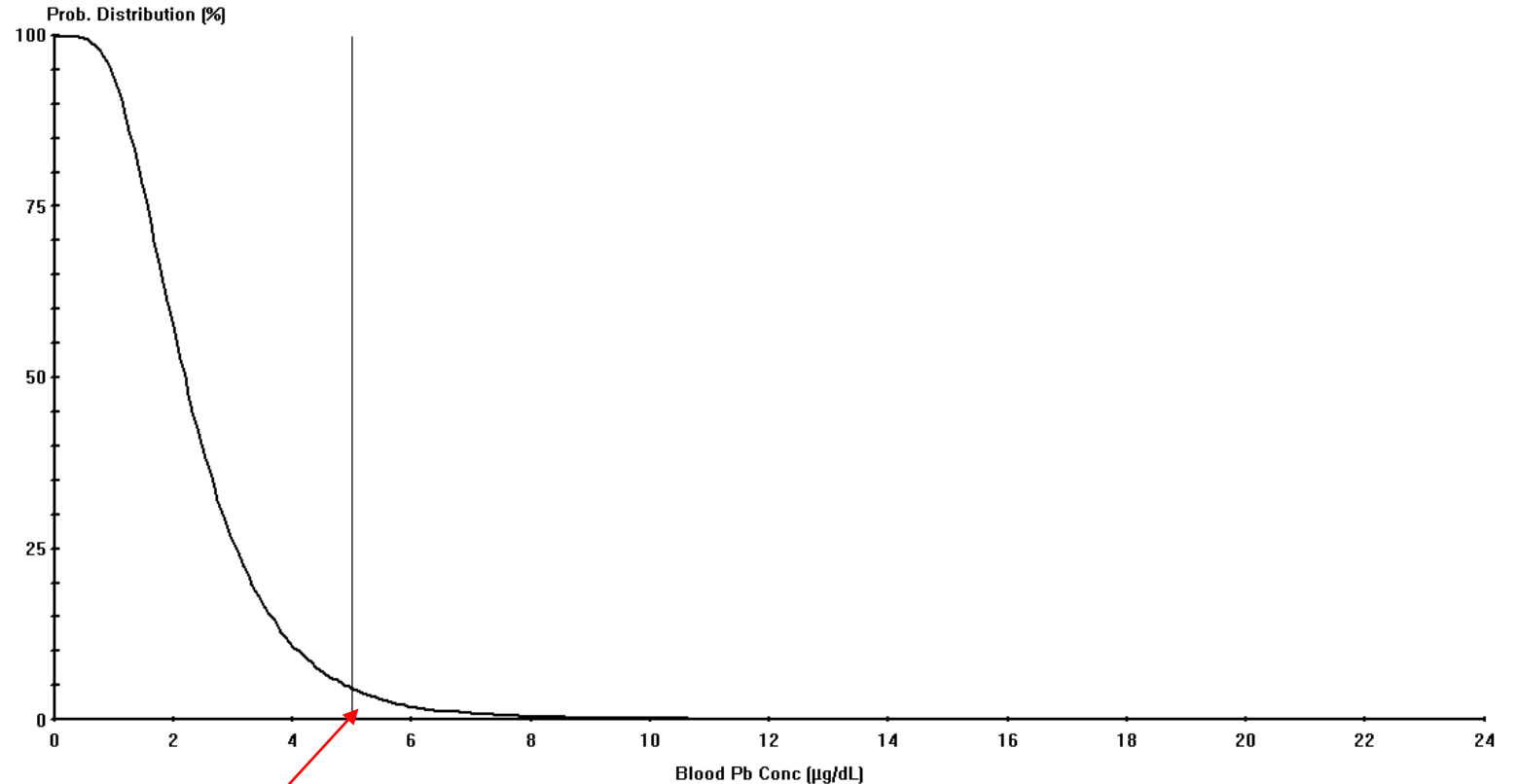
Age Range = 12 to 72 months

Run Mode = Research

These IEUBK Model results are valid as long as they were produced with an official, unmodified version of the IEUBK Model with a software certificate. While IEUBK Model output is generally written with three digits to the right of the decimal point, the true precision of the output is strongly influenced by least precise input values.

Model Output

- Upper tail of the distribution indicates the fraction of the population exceeding that level when the children have the same exposure history
- the goal is to be below 5% probability of exceeding the target BLL



Cutoff = 5.000 µg/dl
Geo Mean = 2.306
GSD = 1.688
% Above = 4.979

Age Range = 12 to 72 months

Run Mode = Research

These IEUBK Model results are valid as long as they were produced with an official, unmodified version of the IEUBK Model with a software certificate. While IEUBK Model output is generally written with three digits to the right of the decimal point, the true precision of the output is strongly influenced by least precise input values.

Model Output

- Calculate remediation goals

Find Soil Pb Concentration

Select Age Group for Graph: 12 to 72 months

Parameter Change

Change Cutoff	5	µg/dl
Change GSD (Geometric Standard Deviation)	1.6	
Probability of Exceeding the Cutoff (PC)	5	%

Soil and/or Dust Concentration: 200 PPM

Please note: Depending on the values entered, calculating the PRG may take a few moments.

Buttons: Find, Cancel, Help?



Residential Lead Screening Checklist & Residential Sampling

Residential Lead Screening Checklist

I. Evaluate Primary Data Sources

- NAAQS non-attainment zone for lead?
- EJScreen Lead Paint Index \geq 80th percentile?

II. Evaluate Secondary Data Sources on Potential Lead Exposures

- Other local or site-specific information?

III. Evaluate Mitigation Efforts

- Ongoing or past mitigation efforts?

<https://www.epa.gov/superfund/updated-soil-lead-guidance-cercla-sites-and-rcra-corrective-action-facilities>

Residential Lead Screening Level Checklist

Site Information			
Site or study area name			
Location (City/County, State, Zip)			SEMS EPA ID
Current remedial pipeline phase	Does a site boundary exist in SEMs?		<input type="checkbox"/> Yes <input type="checkbox"/> No
Briefly describe any removal or remedial work completed to date, including previous screening levels			
Briefly describe the geographic scope of the study area that was considered while completing the checklist			

Checklist completed by:		
Name	Title and Organization	Date

Table 1: Evaluate Primary Data Sources in "Residential Lead GIS Screening Tool" [**Ctrl+Click here to access GIS tool**]

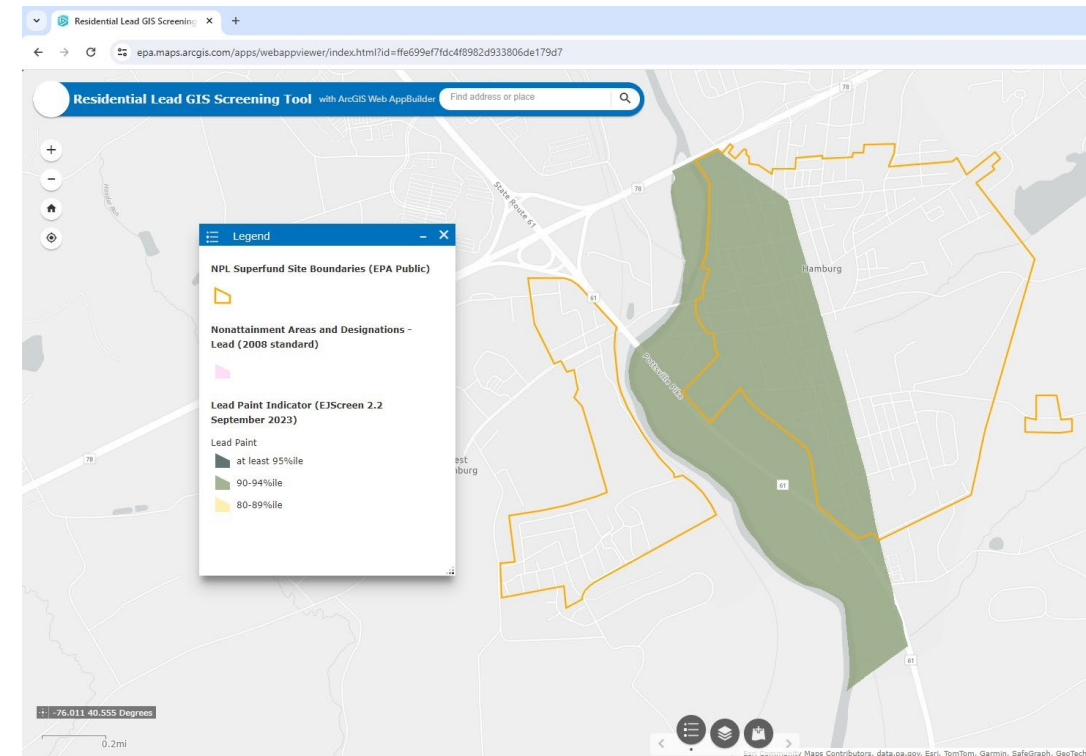
Yes	No	?	Question	Data Evaluation Notes	References
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is the study area in a NAAQS nonattainment zone for lead?		EPA Green Book provides detailed information about NAAQS designations
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Does the EJScreen Lead Paint Index data demonstrate that a majority of the homes in the study area are at or above the 80 th percentile?		EJ Screen Environmental Indicators Census Bureau housing data tools American Community Survey data
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are you able to you select a screening level based on these primary data sources?	<input type="checkbox"/> Yes: 200 ppm <input type="checkbox"/> Yes: 100 ppm <input type="checkbox"/> No: continue with checklist <i>If yes, skip to the last page to summarize the weight of evidence and to document approval.</i>	

Version 1 – February 2024

1

Residential Lead GIS Screening Tool

- Primary data source for Checklist
- Aggregates available national data sets
 - Superfund Site boundaries
 - EJScreen lead paint indicator
 - NAAQS non-attainment areas
- Link for GIS Tool in Checklist



Sampling Approach


- Develop and document sampling approach for site characterization
- Sampling Analysis Plan (SAP)
 - Field Sampling Plan (FSP)
 - Quality Assurance Project Plan (QAPP)
 - Conceptual Site Model (CSM)
 - Data Quality Objectives (DQOs)
- Development of the CSM is an important step
 - Establishes the lead-specific exposure pathways that will be quantified in the Human Health Risk Assessment (HHRA) and development of preliminary remediation goal (PRGs)
 - “Living” Document

Site-Specific Background & Bioavailability

Background Characterization

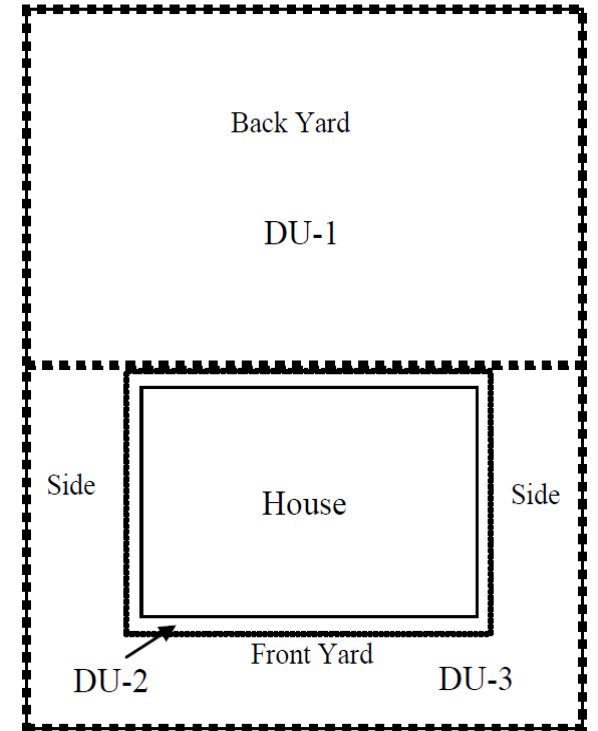
- Important for risk management decisions
- Urban areas – background could be near/above lead screening levels
- Should include natural and non-site related anthropogenic
- Generally do not clean up sites to below background concentrations

Lead Bioavailability

- EPA recommends that Site-specific lead bioavailability data be collected at lead-contaminated Sites
 - Important input to the IEUBK Model and greatly improves the accuracy of the HHRA and can result in a PRG that differs substantially from screening levels
- 

Sampling Units, Exposure Units, Decision Units

- Organizational structure for sampling and decision making
- Developed site-specifically during DQO and SAP QAPP development.
- Exposure Unit (EU)
 - Area receptors have an equal probability of being anywhere in an EU over the exposure duration
- Sampling Unit (SU)
 - a volume of soil from which samples are collected to determine an estimate of the mean concentration for that volume
- Decision Unit (DU)
 - Smallest geographic area of soil that will be subject to a risk-based decision.



Source: ITRC 2012 ISM-1 Guidance

Residential Sampling

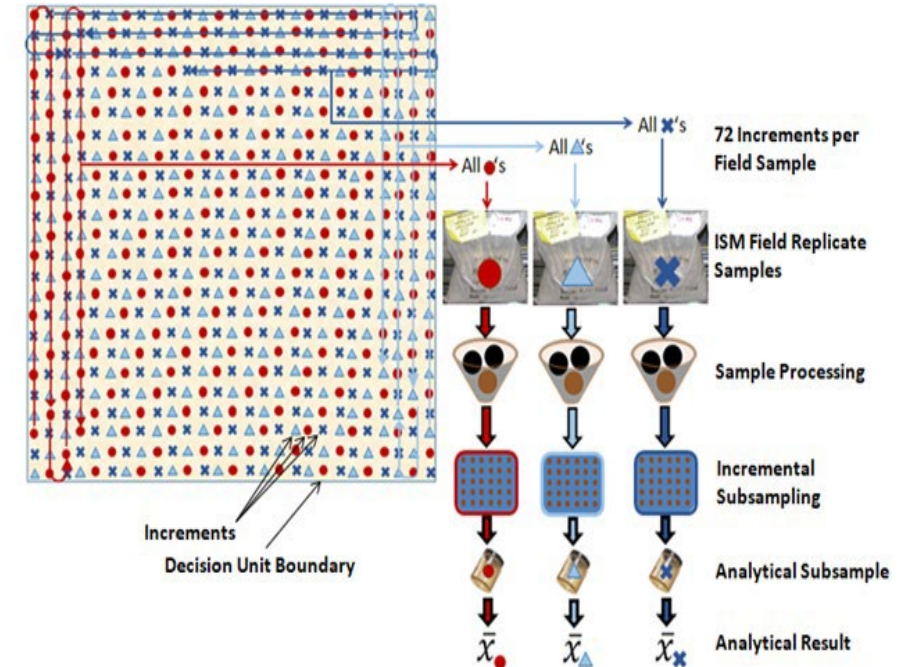
- Residential Property Soil
- Soil in play areas
- Gravel Driveways
- Drip zones
- Garden Soil
- Interior lead dust
- Lead-based paint
- Residential drinking water
- Crawl Spaces and attics
- Other areas –parks, daycares, schools
- Air

CERCLA generally limits the authority of EPA/Office of Land and Emergency Management (OLEM) to respond to Lead-Based Paint (LBP)

Soil Sampling Methodologies

- Incremental Composite Sampling (ICS)
 - Preferred Method
 - Reduces variability in soil concentrations
 - Unbiased estimate of mean concentration
- Composite Sampling
- Discrete Sampling
- XRF Analysis – screening tool

Superfund Residential Lead Sites Handbook, Appendix J, provides a Comparison of Discrete, Five-Point Composite, and Incremental Sampling



Source: ITRC 2012 ISM-1 Guidance



Lead Field Screening Strategies

Field Activities – what are the goals?

- Emergency Responses
 - Need for quick results
- Assessments
 - Need for high defensibility of data
- Removal/Remedial Actions
 - Defensible data, but keep work moving
- Other activities
 - Soil Kitchens
 - Public Events



In-Situ Screening

- Procedure referenced in EPA Field Method 6200
- Instrument calibration
- Screen undisturbed, dry soil in place once removing vegetation/rocks/debris
- Screen a smooth soil surface providing good contact with probe
- Compact soil with pressure
- 30-120 second analysis



Bagged Soil Screening

- Procedure referenced in Superfund X-Ray Fluorescence Field Operations Guide
- Soil excavated and homogenized within a plastic bag prior to screening
- Sieving? Moisture readings?
- Instrument calibration/bag checks
- Multiple readings, 30-60 seconds each



DU or Bag ID: CV-0675A-AsR-A2		Element:	As	% Moisture:	10.7
Replicate Bag Readings	Date & Time	Run Time (sec)	Instrument Result (ppm)	Instrument Error (as 1 Std Dev)	Note?
Replicate reading 1	1546	30	35.0	7	
2	1547	30	25.0	5.0	
3	1548	30	32.0	6	
4	1548	30	25.0	7.0	
5 (optional)	0	0			
6 (optional)	0	0			
7 (optional)	0	0			
8 (optional)	0	#REF!			
9 (optional)	0	#REF!			
10 (optional)	0	#REF!			
		Mean	29.3		
		SD	5.06	Ttl %RSD	17.29
		n =	4		
		ProUCL distribution =		(optional)	
	2-sided	Sample 95% t-LCL =	21		
	2-sided	Sample 95% t-UCL =	37		
	1-sided	Sample 95% t-LCL =	23		
	1-sided	Sample 95% t-UCL =	35		
	1-sided Smple 95% Chebyshev LCL =		18		
	1-sided Smple 95% Chebyshev UCL =		40		
		instrument error =		21.55	as %RSD

EPA Method 6200 – Full Field Laboratory

- Procedure referenced in EPA Field Method 6200
- Drying of samples – 2-4 hours
- Mortar and pestle
- Sieving of samples - #60
- XRF sample cups
- Blanks/Instrument calibration
- 30-240 second analysis
- Decontamination



Other XRF screening

- Lead paint
- Wipes
- Dust

